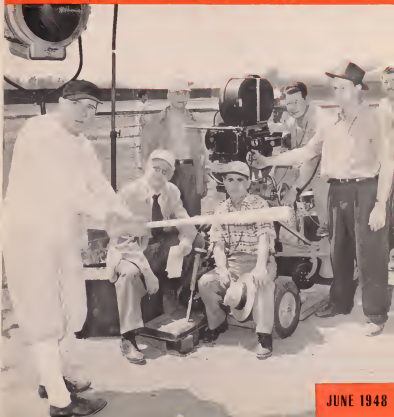


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JUNE 1948



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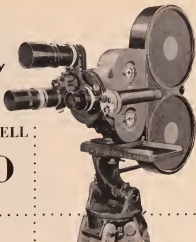
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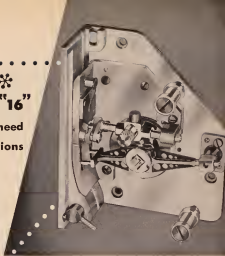
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THE MOTION PICTURE CAMERA MAGAZINE

VOL. 29

JUNE, 1948

NO. 6

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ON THE FRONT COVER—William Bender, who stars and plays the title role in "The Babe Ruth Story," takes some practice swings for the camera. Director of Photography Philip Tannura, A.S.C., is seated directly under the camera lens, with Director Roy Del Ruth watching the action at Tannura's right.

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"BABE RUTH STORY"

BASEBALL PRODUCTION

ON THE STAGE

By PHILIP TANNURA, A.S.C.



PHILIP TANNURA, A.S.C.

AFTER more than a year of preparation—during which time every phase in the life of baseball's greatest hero, Babe Ruth, was thoroughly studied and checked—producer-director Roy Del Ruth launched production on *The Babe Ruth Story* for Allied Artists release.

For the first time in picture history, a replica of the Yankee stadium, New York, was built on a studio stage at a cost of \$30,000. And it is on this stage that most of the sequences depicting the action on the baseball diamond are photographed.

Decision to put the ball park inside the studio stage came after careful investigation and study of lighting conditions. After surveying all factors, it was decided that light conditions could be handled at an even level on the stage for all shots—but more important—we did not have to contend with uncertain weather from day to day on the outside when hundreds of extras were required for backgrounds. As a result, not a day's shooting was lost due to inclement weather conditions.

The lighting problem for this set had

to be carefully studied, as it had to appear on the screen as though it had been done at the actual stadium, with a documentary feeling rather than artificiality to the audience. As a result, all artistic effects in lighting were thrown aside, and we concentrated on an overall setup that would duplicate the actual sun.

With this basic premise, I discarded all thoughts and ideas of backlighting and highlights. As a preliminary, I obtained numerous press photographs of various baseball games, and carefully studied the lights and shadows falling across the grandstand and baseball field. A fortunate discovery in such examination of photos showed that—where a balcony (or so-called upper deck) projected over the lower grandstand, the crowds seated in the latter were mostly in shadows in the front rows and tapered back into darkness.

This situation was an excellent break photographically, as we had painted back-sets of the lower grandstand, with outlines of thousands of spectators painted on them. My particular and most important assignment—as Director of Photography

—was to blend the real people and extras seated in the first several rows, with the painted spectators on the backings to provide illusion of the stands fully packed with people.

After this effect was accomplished, I named to the complex lighting problem of the actual playing field. In general, *studio* stage exterior shots appear artificial due to the lighting employed. In order to make actors stand out, many backlights are utilized to prevent the setting from going flat. In addition, many of the sets are built close to the wall of the studio stage, thus restricting the Director of Photography from getting a realistic effect. Further, use of many backlights with poor source

(Continued on Page 277)



As left is shown protective wire screen and stands for cameras used when shots were required from behind the batter and home plate for *'The Babe Ruth Story'*. The baseball field appears on the sound stage is shown at right. Note blending of live actors in front rows of stands and painted spectators in the shadows in upper tiers.

TELEVISION AND THE MOTION PICTURE INDUSTRY

By W. W. WATTS

(Vice President of RCA in Charge of Engineering Products Division)

(Editor's Note: This stimulating address on the rapid developments taking place in television and the relation of the motion picture industry to television, was presented by Mr. Watts at opening luncheon of the Society of Motion Picture Engineers convention at Santa Monica, Calif., on May 17, 1948.)

IT is hard, in an address on television, to trace its growth, mention the first whirling disc scanner, and quote early data. All of this is of little consequence compared to an appreciation of television as it stands today—an 'infant' industry growing into childhood and an understanding of where, as a youth, it may go tomorrow.

Recently, we (RCA) published an advertisement announcing that television is now 'Forty Million Big'—reference not to 40 million viewers, or anything like that number, but pointing out that television service now covers an area such that it is available to 40 million people. Quite an audience, even for this town of superlatives!

Or consider that for many years every broadcast of the NBC Symphony under Toscanini had been viewed in one of the largest studios by capacity crowds. Yet, on the night when it was first televised, it was seen and heard by more people than the sum total of all the previous radio audiences.

To recognize the impact of this, a brief glance at some current and future statistics is needed, although these statistics seem to shift almost momentarily.

There are now in operation 26 television broadcast stations.

F. C. C. Construction Permits have been granted for 68 more stations. Behind these

stand the applicants for 219 additional stations although only 135 can be presently granted because of limited channel availability.

If the currently proposed F. C. C. revision of television channel allocations is enacted, then, ultimately, there will be channel space for 953 stations in 456 cities—with an audience that could grow to equal the estimated 66 million radio sets now in 57 million homes.

There are, of course, other forms of television than the home type discussed thus far, i. e., Large Screen Television—a nomenclature sometimes applied to television pictures from 15" to 20" to the one 15' x 20' which Warner Brothers will demonstrate at this convention later this week.

Although past usage has invariably linked these systems to the 'theatre,' it is our belief that theatre television is but one of many applications for large screen television equipment.

Such equipment will be used for audiences at television studios since large numbers of visitors to studio sets actually in use is as impractical in television as in motion picture studios—perhaps worse.

Promotional use in connection with sports and news events will also be made, may in some cases, displace the 'moving light' bulletin boards now widely used by newspapers.

Overflow auditoriums, department stores, hospitals, hotels, cocktail lounges, and night clubs provide additional fields of usage.

There are other uses for television, too, centers on the front of guided missiles

provide a picture by radio to permit guiding the missile to its target, underwater television has obvious uses for locations now beyond man's grasp, or, for hospitals where trained surgeons can demonstrate their technique to audiences far in excess of the capacity of normal surgical amphitheatres. In motion picture studios, directors—on two dimensional television screens—can view tomorrow's 'rushes' while the scene is being shot, can view from an easy-chair on the floor what is being filmed by the motion picture camera as it gyrates above some huge set on the top of a camera crane. Further extension of this principle indicates the possibility that in future warfare the Commander-in-Chief may observe action in various overseas combat areas from a central control room in Washington.

With possibilities such as these, several of the motion picture companies have actually begun their participation in television.

Paramount, through television studio operation and film storage demonstrations at the New York Paramount Theater, have shown a live interest in television.

Warner Bros. and Twentieth Century-Fox have filed applications for television stations in several cities.

More than a year ago, development work at RCA indicated the attainment of large screen television pictures on a basis superior to past performance. Some of the motion picture companies were interested. Active equipment inquiries came from national circuits, local circuits, and independent theatres. However, until programming possibilities had been explored and customer 'know-how' had been developed, we were not too sure what equipment would ultimately best suit our customer needs. We could easily 'build a boat that couldn't be moved up the cellar stairs.' Accordingly, several motion picture companies were offered what have since been called 'Joint development contracts' under which we agreed to furnish

Technical information and 'know-how.'

Engineering assistance.

A large screen projector capable of throwing a 15' x 20' picture, and ultimately, an 18' x 20' picture.

A large screen projector capable of 6' x 8' projected pictures.

A landscape photography system which, when coupled to a high-speed developer, is capable of feeding film to a standard theatre projector in a short time cycle—less than 1 minute.

The services of trained theatre service engineers.

As you all know, Warner Bros. and Twentieth Century-Fox joined us in this undertaking and now have some of the equipment in operation and the balance scheduled for early delivery.

These systems are all constructed as

professional equipments without regard to physical dimensions or installation requirements. Indeed, the larger projection unit, employing a 42" reflector, contains the largest Schmidt lens system now in use, although an astronomical telescope will eventually be in use as Mr. Palemar with a 72" reflector. This 42" television unit is affectionately referred to as "Behemoth, Mr. P." because of its resemblance to a gigantic Bendix Washer.

It is from the use of these systems that it is believed information will come on programming and installation requirements from the specialists in theatre programming—you, the motion picture industry!

The kinescope photography system mentioned can also be used for "remote" photography from sets, i.e., a television camera picks up the scene and feeds it to a viewing monitor at a remote point where it is first photographed on film. It suits to date—of course inferior to regular motion picture practice, but capable of substantial improvement after further work, and potentially useful in creating new techniques of motion picture production.

But, to return to the theatre program. What, but several experience, will reach all of us how the great potentials of television can best be used in the theatre? Will it be for news? For sports? Do you interrupt programs for "live dashes"? Which programs should be aired? Which repeated? These are a few of the problems.

Another programming problem concerns theatre television use of broadcast material. Today, even with hundreds of thousands of television receivers in use, still only a small part of the general population has access to televised programs. Hence, at this stage and for some time to come, much of the remaining population may be willing to pay admission solely for the privilege of seeing certain events. But later, when the public is saturated with home television receivers—then will broadcast television material have a place in theatres?

What value has the "closed circuit" program, which will not be available on home receivers? Will theatre (non-cable) broadcast for certain outstanding events? Will you, or really the public, want separate television theatres? Or, will "Dad" watch the boxing matches in the lounge while "Mom" and the "kids" watch the pictures?

These are a few of the programming questions that experience alone will answer and represent the kind of answers sought from the development contacts with Warner Bros. and Twentieth Century-Fox.

Such questions, and a host of others, must be faced—now. Television is moving fast.

How the motion picture industry fits

into the television picture will be determined solely by the motion picture industry itself. And I believe it must be determined quickly.

Television is here—and must be reckoned with. Decisions must be made, and to make them a whole body of facts and knowledge must be assembled. To do this job will require your participation. We of the equipment field cannot provide the answers you of the motion picture industry will need to determine your future course. Sound added new dimension to the silent motion picture industry, and brought a revolution.

Television broadcast stations already use large amounts of film for programming. They're obtaining some of it made years ago! Why does the public keep looking at the current film fare? Novelty and lack of competition? Increased audience and paid advertising will demand and get better film programming. In our opinion, advertising will finance much of this film programming because the American public of free television, like free radio, we are convinced is already here to stay.

You've heard film storage and kinescope photography systems mentioned—the business of photographing on film and picture from a special high-grade television monitor. This makes the television broadcaster a picture producer—of sorts but a picture producer—perhaps chiefly for syndicate or transcription purposes but, nevertheless, a picture producer!

You will notice that this for relatively little has been said about the precise nature of programming, much about equipment. Essentially, that is our Company's position. When we manufacture and sell theatre film projectors and sound equipment, we do not tell the exhibitor what films to run. That's his business and one in which he's well skilled!

And talking of equipment, may I get commercial for one moment and tell you that there is one additional RCA television item shortly due on the market in limited quantities. This is a large screen television projector capable of 7" x 9" picture, suitable for theatre lobbies and lounges, to be sold at a nominal price! We are already convinced it has a great and interesting future.

Let me pause a moment and go back over the broad panorama of television equipment. As you know television stations have, for some time, been using sensitive, image orthicon cameras with speech greater than any photographic stock you can use. As a matter of fact, this is daily procedure in the 26 television stations now in operation and, of course, will be in the nearly 1000 that may yet come into being.

Remember, too, that these stations are already filled from remotes of their own studios. They range far and wide, and from remote locations pick up and origi-

nate programs of interest that are, with great ease, fed to the television transmitter by means of microwave relays. The availability of this type of equipment in a few brief years represents no mean accomplishment.

You are all aware that nation-wide television station chaining is on the way—by telephone company coaxial cable and microwave relays—now serving the Eastern Seaboard and rapidly being extended westward—by Western Union microwave circuits newly placed in operation in the East—or by station-owned microwave relays, some of which have been functioning for some time. You see—a lot of equipment available for the work of a new industry is beginning to grow.

Add to that the equipment I have previously mentioned for large screen theatre and commercial use and the list has grown still larger. Of course, much of this equipment is currently turning out technically crude fare. Consider for a moment the type of picture that would be produced if one of your best stages, complete with lighting equipment, cameras, sound recording equipment, and all the other accessory items were placed at the disposal of inexperienced personnel!

Broadcasters need your techniques your "know-how." They can learn much from your lighting, make-up, direction, sound recording, and other techniques! Only a few television shows, like the New York Theatre Guild presentations, come close to your standard.

It is obvious that much of this equipment which we have been discussing utilizes motion pictures or motion picture techniques in some form. It has been estimated that television stations of this country will ultimately require some feet of film than Hollywood now produces, primarily because of the fact that there are few chances of extended runs on television. Very few pictures bear any resemblance with the naive audience. If you could build a theatre large enough to accommodate all of the patron of a two-week run, you would show your film only once—thus television!

Let's do a little forecasting based on current AM-FM broadcast practice and see if we can get some idea of what the potential film usage of television might become. Today there are about 2500 AM-FM stations on the air. One-half or 1200, are chain or network affiliates. I'm speaking only of the four major chains. They operate about 16 hours per day. To be conservative, let's say they use only five hours of chain-originated material daily. That adds up to 4 chains at 5 hours or 20 hours daily, times 365 days, or 7300 hours of network originated material.

Now let's see how these figures might apply to television. I have already mentioned that the FCC has proposed nearly

(Continued on Page 208)

THE APPLICATION OF MOTION PICTURE TECHNIQUE TO TELEVISION

By RALPH B. AUSTRIAN

(Photo, Color, & Sound)

I read an address delivered by Mr. Austrian to members and guests at the regular monthly meeting of The American Society of Cinematographers, May 24, 1948. Mr. Austrian is with the New York advertising firm of Foster, Cone & Belding.

* * *

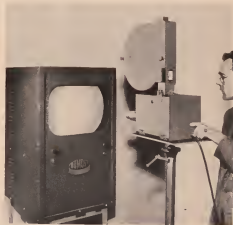
The day of motion picture films produced exclusively for television is close at hand. The rapid increase in commercially operated stations, together with the large number of applications for additional licenses on file with the FCC, are some of the factors which lead to this conclusion.

50,000,000 sets are expected on the market shortly. At this rate, the cost of making motion pictures exclusively for television would be warranted. With television technique currently more backward than motion picture photography in its pioneer days, professionally made motion picture films alone, provide the answer to popular entertainment demands.

Although on May 21, 1948, in 14 states, there were only 25 stations operating commercially, 352 are now in sight with an eventual total of 1000 stations serving available wave bands.

In the East, from Boston to Virginia, seven stations are interconnected and are already operating simultaneously. When considering the fact that Toscanini's single televised concert was seen and heard by more people than the sum total of his audience in his ten previous years of broadcasting ten concerts a season, the implications of video's future are far more.

Motion picture films are necessitated by the many inadequacies of live television, and by the great popular response to this type of entertainment.



KODAK TV RECORDING CAMERA SHOOTING MONITORING TUBE—Edgar O. Dean tips a switch starting a new 16 mm television recording camera developed by Eastman Kodak Company at Rochester, N. Y. The camera projects images directly from the face of the tube.

Inadequate studio facilities provide one of the defects of live television. NBC, CBS, and DuMont, the three main stations, are operating in small, badly equipped studios. Inadequate lighting, which is either too hot or too far, shadows ensuing from the use of multiple cameras, the inadequacy of a general lighting set-up, which may be good in the case of one camera, but ineffective, when another is shooting, the absence of effective editing devices, necessary limitations upon the kind of shot used, and the difficulties of off-make situations are further problems.

On the content side, Hooper ratings have established that old feature films have the greater audience appeal than newscasts, musicals, quiz programs, interviews and dramas.

Lighting presents the greatest single technical problem in live show production today. Television started out using banks containing hundreds of small hot lights because the original television camera was sensitive to the blue end only. Although a fine normal image was obtained, the actors found the heat resulting from so much light unbearable.

About a year and a half ago a new television camera was introduced, which is about 67 times as sensitive as the earlier camera. Since it is sensitive in the red end of the spectrum only, (unlike movie

film which is sensitive from red to blue, less light is needed. However, it does produce a coarse grained image, shows up the most minute facial defect in indoor shots, and makes for a slight weariness in the reproduction of outdoor events; the results are more satisfactory.

When shooting live shows, it is advisable to keep away from the extreme low end and the extreme high end of the gray scale. That is, the television film should not have any white whites or any black blacks. The entire tonal range should be from light gray for faces to a less-than-black for such things as shadows and dark clothing. Development should be full, but prints, either thirty-five millimeter contact or sixteen-millimeter reduction, should be from two to three points lighter than for theatrical release. If one of these prints is viewed on a regular projection machine, it should give the appearance of having a gray tone over the entire frame. If this procedure is followed, faces will no longer be two black spots and a pair of lips in a white mask. The faces will really show. For optimum reproduction the television system demands about as many dark tones as there are light tones. Avoidance of abrupt changes in adjacent scenes is also a wise procedure.

Keeping the main characters as nearly as possible in the center of the finder is also helpful. Due to the curved surfaces of the receiving tube, if they work toward the edges, faces will get flatter, and horizontal distortion will be evident. It also helps to mask the finder down a little bit on all four sides. The same applies for written titles. Keep them in the center of the finder with generous margins on all four sides.

Although the fluorescent lights now replacing the former lights do not throw off heat, they do result in the lighting.

The necessity of using four cameras on the average live show poses the same problems which faced the early motion picture cameramen when sound came in.

Another difficulty facing the television cameramen is the fact that he has no way of knowing in advance when he will be "on the air." Until he receives direction through his earphones to dolly in or out, as the case may be, from the director watching the main screen, and until a red light flashes in his finder, he has no way of knowing what to do, or if he is "on the air."

With four cameras and attendant cables, the lights are inevitably in the way of one or more of the cameras. The necessary general lighting further eliminates the possibility of good close-up lighting.

If the characters in a single play are expected to go to another set, a black out occurs while they are going around stage. The absence of good cutting or editing

techniques is a decided disadvantage since the show is "on the air" constantly.

Another disadvantage of live shows is the impossibility of reverse angle shots as well as many of the other shots available to the veteran motion picture photographer. An attempt to shoot a reverse angle shot would result in an image of the camera shooting from the other side.

An additional problem is presented by the shadows cast by the artists in the boom. This, too, was a familiar problem in motion picture cameramen in the days when sound first came in.

Attendant variations in sound "off mike, and the large and bulky cameras present still additional difficulties.

Television cameras make use of a conventional lens with a larger plane. Speaking of lenses, the Zoomer lens, although widely touted as a television discovery,

has long been used in theatres. While capable of achieving dramatic, swooping down effects, it is unable to produce a sharp image, when moving quickly from a long shot to a close-up.

One great hope of improving live show television lies in more extensive use of projected backgrounds, so effective in motion picture photography today. If results can be obtained comparable to those achieved by the motion picture photographers use of projected backgrounds, less lighting will be necessary.

The various problems facing television cameramen today are similar to those which faced motion picture cameramen in the silent and sound stages of their industry's development. There is no doubt, therefore, that the advice of experienced motion picture professionals would save television technicians a great deal of its necessary grief and expense.

25 YEARS AGO With A.S.C. and Members

• World traveling Glen Kennerly described his own man film-making expedition into Mexico in the spring of 1923 and the excellent photographic possibilities of the land of the Aztecs.

• Paul Whelan, then secretary of the A.S.C. had joined the Douglas Fairbanks unit as specialist in effect and trick photography under Director of Photography Arthur Edison for "The Thief of Bagdad."

• Goldwyn Studios in Culver City (now MGM) switched from glass-covered lenses which provided actual sunlight during production, to closed angles and full dependence on electric lighting for sets.

• H. F. Koenekamp completed a Larry Simon subject, "The Shop."

• Henry Sharp and Kenneth MacLean were jointly photographing a Dorothy Davenport starer for Thomas Ince Productions.

• After completing a group of features for Warners, Homer Scott returned to the cinematographic staff of Mack Sennett.

• L. Gay Wiley was in charge of photography for the William De Mille feature, "Only 38" at Paramount.

• Burton Steene, while on a filming tour of Europe, was engaged by a German producer to make serial sequences for a German production.

• John Dored was busy travelling through Europe photographing events for an American newsreel company. He had recently covered Germany, Poland, Russia and Latvia.

• Sam Landon was installed as camera-

ographer in chief for Finn Fox Productions.

• Phil E. Rosen was elected chairman of the executive council of the Motion Picture Directors Association.

• Victor Milner described his photographic adventures in making a picture of the Hopi snake dance ceremony in Arizona.

• Andre Berlioz wrote an article exploring his achievement in double-exposing semi-invisible or sparse forms for the Goldenweat feature, "Earthbound."

• Harry Perry described a camera motor drive devised for making aerial shots where cramped space in the photographic plane did not allow the accepted hand-cranking of those days.

• David Abel was in charge of photography for "The Barefoot Boy," which Miss Allen was producing.

• William Elwell joined Tod Browning camera staff on "The Day of Faith."

• George Barnes pulled out for New York to photograph a Cosmopolitan feature.

• Walter Griffin wound up camera work on "The Silent Partner" for Paramount.

• Ben Kline was back at Universal after recovering from a three week illness.

• James Van Trees was off on location hunt to photograph "The Hottentots" for First National.

• Charles Schornbaum was completing "The Heart Breaker," Agnes Ayres starer for director Wesley Ruggles at New York.

• Homer Scott was photographing "The Exes Girl," Mabel Normand starer, for Mack Sennett.

• Harry Thorpe was shooting "John of the Woods," a Darryl F. Zanuck production.

• Henry Courjaeger was in New York for Famous Players-Lasky.

• Mitchell Carrera Corp. was adding to its plant and staff to increase output of the professional cameramen to meet demand.

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COLOR—WHAT IT IS—HOW TO USE IT

By RICK MANSELL, B.Sc., A.R.C.Sc.

COLOR is not a substance possessing weight and particle size. It is an internal sensation produced in us as the result of the action of light rays on the retina of the eye. It is the result of a visual reaction stimulated by certain nerve centers of the eye. Color is, therefore, a physiological response to the stimulation of certain light wave vibrations. It is first produced in the human eye mechanism and then translated by the mind of man into certain abstract ideas. To produce this sensation of color some form of light is necessary.

The most common source of light is that emitted by the sun. It can be demonstrated that sunlight is composed of light rays of various colors which possess varying wave lengths. For example, after a summer's rain there are water particles floating in the atmosphere. These possess the ability to break up the sunlight into its constituent colors, producing the complete spectrum as is observed in a rainbow. We are all familiar with the separation of sunlight into its component colors by passing it through a glass prism. In a similar way a rainbow is caused by drops of rain which themselves act as apertures to separate the component parts of the sunlight that shines through them to produce that optical phenomenon which we call the spectrum.

The different colors of which a given light is composed, when arranged in order of their wave length constitutes the spectrum of that light. All light from glowing bodies has a continuous spectrum, that is to say, that there are no blank spaces between the different colors. Red possesses the longest wave length of the visible rays in sunlight, while violet has the shortest. All the other colors are arranged between these two. In order that we may remember the actual order of the arrangement of these colors we use the word *ROYGBIV*. In this word we have the first letter of the colors composing the visible spectrum. The colors in this spectrum are red, orange, yellow, green, blue, indigo and violet.

When light of any type strikes certain surfaces the material composing these surfaces will absorb some of the colors in the light and will reflect the remainder into the eye of the observer. It is this selection of the spectrum which is reflected

that controls what is known to us as the color of the surface. For example, if a particular surface absorbs the *ROYGBIV* component of the light striking it and reflects the *Y* portion then we designate the surface as being a yellow surface. We say it is yellow because it selectively reflects the yellow portion of the spectrum. Thus, a particle of the pigment chrome yellow absorbs all the component parts of the spectrum with the exception of the yellow. A particle of a purple lake will absorb all the rays of light with the exception of the red and the blue, and the combination that reaches us of these two colors is purple.

However, when a large proportion of the sunlight is reflected from a certain surface without any such process of selective absorption then we get the sensation which we have all agreed among ourselves to call white. When most of the sunlight is absorbed by that surface and very little reflected into our eyes, we designate that surface as being black.

The sunlight that reaches us varies in its composition depending upon the time of day. Thus, for example, there is less blue in the light that reaches us early in the morning or late in the afternoon as compared with the light that reaches us near mid-day, when the sun is high up in the sky. This factor is used whenever exact color matching is required in an industry.

The color of a substance will depend upon the character of the source of light by which it is illuminated. Thus, the composition of sunlight (daylight) is different from the light emitted by an electric light bulb. Hence the color of a given substance will appear different when examined by ordinary daylight as compared with its color when examined by the light of the electric bulb. The difference is particularly noticeable in substances which have blue, green and purple colors associated with them.

If we use a red light in a room instead of the white light, then the reds, yellows and oranges, will all appear whiter while the blues and purples will appear blackish. If we use a blue light in a room instead of the white light then the reds and oranges will appear black, while the blues will seem whiter. It is, therefore, evident to us that the white light under which we

see the color of a substance must be very different in composition from the red or from the blue sources of light. In actual fact, we can consider white light as being composed of three kinds of light—red, green and blue.

There is a direct method of producing colored lights by causing certain gases to glow as a result of the action upon them of electrical impulses. Examples of these are the mercury vapor light, the yellow sodium light, the neon lights and the other gas filled lights in this class.

One more method of producing the color sensation in the eye is worth mentioning at this time and that is the effect produced by a direct nerve stimulation such as by pressure or by sudden blow. If a person is suddenly struck in the eye when he is in a dark room then that person will see both light and color.

In this way we can see that color and light are inseparably associated. Without light there can be no color. The source of the light whether it be the sun or some artificial means produced by man, will have a profound influence on the color effect produced by any substance.

The term "color" is used in a general way to refer to any kind of light sensation other than black and white. When we look directly into a source of light we see the actual color effect of the light waves which that source sends out. When we look at a surface we see the color effect produced after that surface has absorbed a certain portion of the colors in the light that strikes it.

We must always remember that the color in the last analysis will depend on the kind of sensation produced in the visual centers in the brain of the individual observer, and this effect may vary from individual to individual. Frequently most of us are so accustomed as to see approximately the same color in a given situation but there is a minority whom we call color blind and who see colors in a different way from the majority. Their nerves may be dormant towards a certain range in the spectrum and we call them color blind toward that range.

The term "hue" is used to describe the dominant wave length present in a given color sensation. It is that quality which

(Continued on Page 314)

A.S.C. OFFICERS INSTALLED AT GALA DINNER MEETING

With film stars Tyrone Power, Linda Darnell, and producer-director David Butler as honored guests, members of the American Society of Cinematographers attended dinner meeting on evening of May 3rd for formal installation of officers recently elected to serve for the coming year.

Charles G. Clarke was installed as president, Arthur Edson as first vice-president, Alfred G. Gals as second vice-president, William V. Skall as third vice-president, Fred W. Jackson as executive

vice-president and treasurer, Ray Rasmussen as secretary, and John W. Boyle as sergeant-at-arms. The latter three were re-elected to their respective positions.

In addition to the above officers other members of the Board of Governors in clude John Arzoff, George Folsky, Lee Carmes, Sol Polito, Charles Rosher, John Seitz, Leon Sharney, Joseph Walker, with alternates comprising Ernest Halter, Sol Halprin, Arthur Miller, Hal Mohr and Joseph Rasmberg.

Taking advantage of the presence in

Hollywood of many outstanding engineers, a technical meeting of A.S.C. was held on evening of May 24th.

Ralph B. Austman of Foote, Cone & Belding, New York, spoke on "Application of Motion Picture Technique to Television Photography," (printed in this issue), and Thomas H. Miller of Eastman Kodak Company, Rochester, gave his paper on "Making a Technique for Improving the Quality of Color Reproductions." Carl B. DeMille was honored guest of the evening.

WHEN A.S.C. OFFICERS WERE INSTALLED Below two views of the members and guests in main room of the A.S.C. clubhouse. At right (standing), Tyrone Power, first vice president Arthur Edson and president Charles G. Clarke. (Seated) Linda Darnell and producer-director David Butler.



"THE LADY FROM SHANGHAI"

FIELD DAY FOR THE CAMERA

By HERB A. LIGHTMAN

ONE just naturally expects an Orson Welles picture to be *different*. Since he invaded Hollywood in a cloud of Mexican terror several years ago, Welles has brought to the screen such off-the-beaten-track films as "Citizen Kane," "The Magnificent Ambersons" and "Journey Into Fear." Each of these has looked over the traces in one way or another "Kane," especially has been cited by serious students of the cinema as a revolutionary departure in film technique. While some of the stiffer critics branded the film as "consciously arty," none could deny that it was, at least, *different*—a refreshing respite from the glouilly stereotyped style so typical of our entertainment films.

Welles, perhaps more than any other director of the present decade, has brought a certain freshness to the screen. His originality is based on the premise that anything worth showing to an audience is worth showing dramatically. If he sometimes goes a bit overboard with the result that the creaking of the machinery can be heard, he is still to be complimented for endeavoring to inject a fresh perspective into the presentation of cinematic ideas.

His latest film, "The Lady From Shanghai," is *different*. Technically speaking it is

an excellent job. It misses being an important film only because its plot is so cryptic that the movements of the main characters become estranged to the point of obscuring the continuity. Even so, it is, because of Welles' fine direction and the striking photography of Charles Lawton, A.S.C., a powerfully entertaining film.

Background For Murder

The plot of "Lady From Shanghai" is much too involved to permit summing up in a sentence or two. Suffice to say, it concerns a group of thoroughly disagreeable people (including the unsmiling Rita Hayworth) who live in an unsupporting but good-natured seamen (played by Orson Welles) onto a pleasure yacht bound from New York to San Francisco. It is evident from the very beginning that there is homicidal bawdy-panty about—but the real mystery (at least from the audience's point-of-view) boils down to who wants to murder whom and for what reason. Everyone on the yacht hates every one else, and each tries to lure the somewhat slow-witted seaman into doing the dirty work for him. The stakes in this murder derby appear to be a huge sum of insurance money, plus the undivided at-

tention of Miss Hayworth.

With this network of conflict as a basis, the story begins in New York, goes aboard a yacht, stops at various Caribbean ports with a layover at Acapulco, Mexico, and ends up in San Francisco. It is in the City of the Golden Gate that Welles stages action against some of the weirdest locales ever seen on the screen. These settings include a dimly lit aquarium, the famous Mandarin Theatre in Chinatown, and the crazy house in a closed-for-the-season amusement park. If there is anything missing, it can only be the kitchen sink.

Although the audience may strain its collective cerebellum trying to keep up with the vagaries of the plot, it cannot fail to be thrilled by the brilliant combination of action and photography which the picture boasts. Welles may confuse an audience but he is never guilty of boring one. In this case he has achieved some highly original effects, and his (as always) contributed heavily to the development of a fresh cinematic approach.

The Camera Creates Mood

Before "Lady From Shanghai" actually went before the camera, it was decided to infuse the entire production with an ominous mood. Director of Photography Charles Lawton, A.S.C., discussed various approaches with Welles and decided to achieve his effect through a combination of low key interior lighting, and natural light sources with comparatively few reflections for exterior scenes. In this way a smooth flowing continuity was established between interior and exterior sequences. Transitions from outdoor to indoor sequences were effected without too severe



Left: On location in Mexico, Orson Welles briefs his crew prior to filming a sequence from Columbia's "Lady From Shanghai." At his side is Director of Photography Charles Lawton, A.S.C., whose extraordinary photography adds greatly to the impact of the film. (Center): View from yacht the "Zara" to stream nestled in Acapulco Harbor. Below: one of the boats on which exterior shots were distributed between the night and the previous shot. (Right): For a scene shot in the jungle streams of Mexico, the camera is mounted on a dugout canoe alongside the boat in which the principle players sit.

a contrast in lighting largely because of the heavily filtered skies which dominate the exteriors. To gain this effect a combination of 23A and 56 film was used.

The use of natural light for exteriors, with its harshly contrasting shadow and highlight areas, allowed for some very dramatic modeling of facial features. In one sequence shot at Acapulco during which Welles and a sinister lawyer climb a hill so that they can discuss a phony murder proposition, no reflections at all were used. Welles was wearing a white linen suit which made his face look dark and somber—while the lawyer wore grey clothes which did not contrast so sharply with his skin and made his complexion appear white and sickly.

Closely complementing the dramatic interior and exterior lighting, are the dynamic compositions which cinematographer Lawton has applied so effectively. A distance departure from conventional technique is the use of the wide angle lens for extreme close-ups of people. The resulting distortion is directly in key with Welles' desire for exaggeration in these shots. In many cases the exaggeration was enhanced by filming such close-ups from weirdly grotesque angles.

Perhaps the most striking sequence in the entire picture is that filmed in San Francisco's Steinhilber Aquarium. A masterpiece of mood, it is lighted solely by sodium simulating the light from the display tanks. The players (Welles and Miss Hayworth) are thrown into silhouette against these tanks for the most part, and are effectively rim-lighted when the camera adopts another angle. What really impresses viewers, however, is the huge close-ups of grotesque sea-creatures which form a background to the players as they deliver their socratic dialogue. By means of background projection the movements of conger eels, sharks and an octopus were precisely timed to match the thought provoked by the dialogue.

For example, when Miss Hayworth warned Welles that her husband was plotting a nefarious murder scheme, a huge shark glided behind her. When she spoke of the lawyer, a slimy eel dominated the background. Enlarging of these sea creatures through process photography lent impact to the symbolism.

Problems of Location Filming

In order to shoot the location sequences for *Lady From Shanghai*, a company of 50 Hollywood actors and technicians flew to Acapulco, along with 60 Mexican extra players and technicians from Mexico City. More than 15 tons of equipment were shipped from Hollywood, one order of six tons computing the largest single air express shipment ever undertaken by a movie location company.

For the yachting scenes in tropical Mexico, Columbia Studios chartered Enol Flynn's luxurious yacht, the *Zaca*, and Flynn himself served aboard as skipper. Scenes were filmed above and below decks, at anchorages in Acapulco Harbor, at Fort San Diego in Acapulco Bay, at Morro Rocks and other scenic spots, as well as at sea. A lavish new night club, Ciro's, located atop the swank Casablanca Hotel in Acapulco, also served as a setting, as did the 25-mile stretch of white sand beach at Pied de la Cañera.

The transportation of heavy sound and camera equipment through the tangled Mexican jungle was a major problem, but was overcome by the sheer manpower of several hundred hired Mexican porters and coolies. Sound tracks and generators were placed on native canoes lashed together in foam rafts, and then were floated through jungle-clattered streams into shooting position.

Shooting aboard the yacht was from the space standpoint very difficult, and these scenes, as they appear in the picture, are necessarily cramped in composition—but this actually works in favor of the overall effect because it produces an au-

thentic atmosphere of crowded life aboard a small yacht. During filming aboard the *Zaca*, a long line of narrow dugout canoes anchored astern formed a bridge from the barge holding the generator so that electrical cables could be stretched for the camera and sound equipment.

In filming sequences at sea, the camera crew discovered that they could not depend upon their usual meter readings. Reflections from the surface of the water kicked up more intensity than the meter recorded, causing over-exposure of the scene. This effect was noted in the scattering of the first rushes, and a series of experimental tests was made to arrive at some sort of rule-of-thumb that could be used to compensate for the additional amount of light.

Back to Hollywood

Sequences shot at the studio presented almost as many problems as those filmed on location. Welles, always ready to break precedent, rung up a new record for the longest dolly shot ever filmed. With his camera mounted on a 22-foot crane, Cinematographer Lawton kept his lens trained on Miss Hayworth and Welles as they rode for nearly three quarters of a mile in a horse-drawn open Victoria. Several huge arc lights, a sound boom and the camera crane added the full length of the shot near to the Victoria.

Scenes 8 and 9 in Columbia Studios—which adjoin and can be opened up to form one huge sound stage—were transformed into the scene fun house set which serves as locale for the picture's final sequence. Studio workmen constructed sliding doors, distortion mirrors, and a giant slide 125 feet long which began at the roof of the stage and ended in a pit 80 feet long, 60 feet wide and 20 feet deep at the far end of the stage. Half way down was a 30 foot-high design

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"The Lady From Shanghai" is photoplay which draws its force from the fast direction of Orson Welles and the camera artistry of Charles Lawton. A.C. (left) The main characters confront each other in the murky mood of a "crazy house." (middle) Cinematographer Lawton's masterful use of the film's "fun house" sequence. (right) Wide angle composition shot from a low vantage point and drama in the story's presentation. (right) The sequence sequence depends upon low-key lighting: close-ups of grotesque sea creatures and socratic dialogue synchronized to their movements for its sound effect.

REPORT ON SMPE CONVENTION

Sensational progress of television, and the impact of this latter on the motion picture industry, highlighted the 63rd semi-annual convention of the Society of Motion Picture Engineers held at the Santa Monica Ambassador hotel, Santa Monica, California, May 17th to 21st. Between the opening luncheon on the 17th, when W. W. Watts, vice president in charge of the Engineering Problem Division of RCA, gave a most revealing talk on "Television and the Motion Picture Industry" (printed in full in this issue), and the closing session at Warner Brothers Studios on evening of the 21st when large screen television was demonstrated and details of the system explained, television was the dominant subject.

The SMPE convention recently closed on the west coast was one of the most successful in the organization's history—both from the standpoint of registrations, attendance, and informative papers and demonstrations on new products and practices for the improvement of motion picture production techniques.

Among the many pertinent papers and demonstrations on the program were:

MOTION PICTURE PHOTOGRAPHY

"Principles and Practice of Three Color Subtractive Photography," by W. T. Hanlon, Jr. and F. R. Rieley, Kodak Research Laboratories, Rochester, N. Y.

The color vision characteristics of the eye are discussed and the rules which are followed are used to show the requirements for the "perfect" additive and subtractive, three-color photographic process. Since these requirements are not achieved in practice a theoretical study of a practical color process may not always give an adequate analysis of its usefulness. However, such an analysis may point out some of the pitfalls which occur in practice. For example, many subjects may appear the same color to the normal eye and yet give different results when photographed. Also, any given color may be reproduced incorrectly by any process in use.

The effects on picture quality of changes in contrast, balance, and a variety of other variables are shown. The restrictions which some of these factors place on the use of color film are mentioned.

The dye characteristics which cause quality loss in duplications are discussed and the various compromises which must be made in obtaining adequate quality duplications are reviewed.

"Masking: A Technique for Improving

the Quality of Color Reproductions," by Thomas H. Miller, Eastman Kodak Company, Rochester, N. Y.

Currently available subtractive color photography processes provide pleasing pictures of most natural objects. However, when an original color photograph is the subject, as in the cases of duplicating and copying, the resulting reproduction is usually not satisfactory when compared with the original.

Differences between the original and the reproduction are primarily due to the high photographic contrast and the optical characteristics of the dyes in the original.

Making up to improve the quality of color reproductions involves making an auxiliary image, generally by a photographic method, and registering it with the original color transparency. Reproductions are made from the combined transparency and mask.

The characteristics of the color original and the unmasked reproduction and the modifications of the original which are necessary if the reproduction is to match the original, determine the method for exposing and processing the mask. While a single silver mask is usually most practical and sufficient, multiple masks are required for complete color correction.

In Kinetograph negative film two mask images are automatically formed as the dye images are developed during processing. Two of the three couples from which the dyes are produced are colored and the positive images formed by the couples remaining after processing constitute the masks.

"An Improved Safety Motion Picture Film Support," by Charles R. Poole, Eastman Kodak Company, Rochester, N. Y.

Extensive experimental work on Safety Cine Film support has resulted in an improved product which offers possibilities for professional motion picture use.

This product is a highly acetylated cellulose acetate with physical properties which are considerably different from those of ordinary commercial cellulose acetate previously used. Certain improved physical characteristics and improved aging properties of this base material are described in detail.

As a Cine Positive film support the high acetyl cellulose acetate is shown to give satisfactory behavior in printing, processing, and projection operations and compares favorably with present standard Release Positive Film.

Experimental studies on the use of the

high acetyl base for 35 mm. Negative Film are described showing that this base will lend itself to use for negative materials. Particularly important is the fact that this base offers a very low degree of shrinkage on long time keeping.

"Film Standards: Film Dimensions and Behavior," by A. C. Robertson, Eastman Kodak Company, Rochester, N. Y.

This paper deals with certain aspects of the problem of improving 16 mm. projection quality.

The accuracy of timing and perforating of 16 mm. film would have to be considerably better than that of 35 mm. film if the same picture steadiness is to be obtained. The required accuracy is of the same order of magnitude as the best that can be obtained commercially. Variations from the nominal dimensions always occur and follow a typical probability curve.

Although practically all commercial film is slit and perforated to within the recognized tolerances, shrinkage of film with time or changes in dimensions due to changes in humidity means that film as used is often outside of the original specifications. This rarely introduces difficulties because the industry has accustomed these effects. It has, in fact, induced the shrinkage of the negative on the continuous printer. As potential shrinkage is reduced the long run shrinkage effects are improved but difficulty is introduced in making quick release prints. The possibility of new standards for slitting and perforating is considered.

"Flicker in Motion Pictures, Further Studies," by L. D. Grierson, 20th Century Fox Film Corp., Beverly Hills, Calif.

Flicker is defined for the general case and additional information on subjective effects and analysis is presented. The subject is then restricted to those types of flicker which are the result of equipment deficiencies, and quantitative methods for measuring such effects are described.

The application of testing methods in specific equipment, the results obtained, and certain remedial measures are discussed. Finally recommendations for future work in this field are submitted.

"U. S. Navy Photography in the Arctic During the Recent Operation High Jump," by Lt. Charles C. Shirley, USN, Bureau of Aeronautics, Navy Department, Washington, D. C.

The Navy's Operation HIGHJUMP, 1946-47 was by far the largest expedition to enter the south polar region. The primary purpose of the Operation was to train personnel, test equipment, and im-

prove operational techniques in sub-zero temperatures. Every phase of the operation and the performance of equipment undergoing tests were photographed in 35 mm B&W and 16 mm color motion pictures with a view toward producing technical and training films for educational purposes.

The many difficulties inherent in photographic operations in sub-zero temperatures and polar regions require special techniques. These and the malfunctions of cameras, causes and suggestions for their prevention are treated.

The Navy is developing cameras more suitable for use in frigid areas.

Research is being conducted for a less brittle plastic for film bases than is now available for cold weather photography.

The presence of more light on the surface of the south polar ice cap on overcast days than on bright, clear, cloudless days seriously affects photographic exposure. This phenomenon confounds a photographer until he becomes aware of it, as he is accustomed to giving more exposure on overcast days instead of less. The abundance of light in the Antarctic necessitates modification of exposure meters.

"Processing Control Procedures for Anaco Color Films" by James E. Bates and

I. J. Ruyjan, Anaco, Binghamton, N. Y.

Reproduction processing of Anaco Color Film requires continuous control of the solution compositions. Early experience showed that frequent change of processing solutions was necessary to maintain consistency. New replenisher formulas are described which together with regular sensorimetric controls and occasional chemical analysis have proven successful for maintaining the processing solutions in a satisfactory condition indefinitely.

Color balance differences resulting from varied types of agitation, depending on the processing equipment, may be adjusted by changing the chemical constitution of the first developer.

Demonstration Lecture "SEEING LIGHT AND COLOR" by Ralph M. Evans, Eastman Kodak Company, Rochester, N. Y.

The process of seeing is somewhat different from commonly accepted notions. Three sciences are involved in the understanding of its principles and characteristics. All vision of the external world requires light. Light is a physical phenomenon and the principles of its action are described by the science of physics. This light enters the eye of an individual and affects the nerve endings on his retina.

From there an electrical current is produced which travels back to his brain. This part of the subject properly falls in the science of physiology. Certain effects produced as the brain follows well defined laws and are quite predictable in nature. These effects are enhanced by the science of psychophysics.

After a brief discussion discussing the part played in vision by these differing types of action, the present lecture is devoted to a carefully illustrated discussion of the way in which the mind interprets the information so received. A distinction is made between form and color vision and it is shown that for the most part what we see depends as much on ourselves and our experiences as on the external reality which the light presents to our eyes.

The discussion then turns to the seeing of color and in particular to the seeing of colored objects. By a rather complete series of pictures it is shown that seeing is largely a matter of recognition of objects with properties believed to be possessed by these objects. From this it is shown that the mind has the ability to see several things simultaneously at the same spot. It follows that it is not entirely the physical or physiological facts which determine what we see but also

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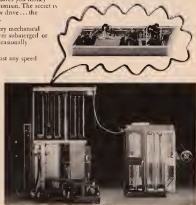
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to a great extent our knowledge of external reality is supplied by the mind. As the best example of this it is shown how it is possible for a person to see simultaneously objects illuminated by light of a certain color and at the same time see the true colors of the objects themselves. This is one of the most basic types of vision and yet it cannot be predicted from the simple physics of the light or the known properties of the eye.

MAGNETIC SOUND

"Magnetic Recording for the Motion

Picture Technician" by Dorothy O'Dea RCA Victor Division, Hollywood, Calif.

It is the purpose of the first half of this paper to present to the motion picture technician a review of magnetic recording theory. There are many excellent sources available which treat the various aspects of this subject. Those who are interested in the detailed scientific explanations are referred to these articles (a bibliography has been prepared) and the extensive patent literature. This paper attempts to consolidate the information in these articles in simplified form and pro-

vide a useful picture of the phenomena in magnetic recording and reproduction for those whose primary interest is in the application of the theory.

The second half of the paper contains of experimental data taken with the new RCA magnetic recording equipment which is described in another paper. Input-output, frequency response and distortion data which were taken under test conditions familiar to motion picture technicians are presented.

"A 35 MM Magnetic Recording System," by Earl Masterson, RCA Victor Division, Camden, N. J.

The introduction describes how the idea was conceived of designing and building a number of kits to add magnetic sound recording facilities to a standard photographic recorder. It is believed that by starting magnetic recording in this manner it will enable the student to obtain some practical experience without the expense of a complete film handling mechanism and yet will not interfere with photography, sound recording production work.

The paper describes the construction of the mechanical and electrical compo-

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nents of the lot and discusses the operational features.

"Some Distinctive Properties of Magnetic Recording Media" by R. Herr, R. F. Murphy, and W. W. Wenzel, Minnesota Mining & Manufacturing Company, St. Paul, Minn.

Information is presented relative to the adjustment of bias current in magnetic recordings and the various effects of bias changes on distortion, frequency response, overload characteristics, and permanency are discussed. Other factors which influence frequency response are outlined briefly and it is shown that the inherent frequency response of the medium is difficult to divorce from effects due to the recording system. The problem of noise is presented in general terms and the nature and level of the noise from a DC saturated medium is advanced as an important criterion of quality.

"Magnetic Sound for 8 mm Motion Pictures," by H. A. Leedy, Armour Research Foundation, Chicago, Ill.

Demonstration

Satisfactory recordings of sound for amateur use on 8 mm motion picture film have been made possible by the development of an improved magnetic powder material. Using a suitable binder this magnetic powder is coated on 8 mm film in the form of a track 0.030 inch wide placed between the sprocket holes and the edge of the film, thus avoiding the necessity of reducing the already limited picture area. Several 8 mm "silent" projects have been converted for use with the magnetic sound film.

The performance advantages and limitations of this development will be discussed. The paper will be concluded by a short demonstration.

SOUND RECORDING

"A Variable Area Light Valve Modulator," by Louis B. Broder, Western Electric Company, Hollywood, Calif.

A variable area modulator is described which employs the ribbon light valve as the basic modulating element. Double width push-pull variable area sound track or standard width delayed sound track may be recorded as will be inserting the appropriate light valve into the modulator. The light valve is registered in

place in the modulator by indexing drums and securely locked by means of lever controlled clamping springs.

The light valve ribbons are oriented so as to be parallel to the direction of motion of the film. The ribbon edges are projected at ten times magnification onto the film to define the amplitude coordinate of the recording image while the image height is determined by a narrow rectangular stop which is imaged onto the film at a 70:1 reduction in height by a cylindrical lens system.

The modulator is a completely self-contained unit embodying the basic components for the recording optical system, an optical system for first projecting an enlarged image of the ribbon aperture onto a viewing screen, a photoelectric monitoring system, and an exposure meter.

"Volume Compressor for Sound Recording," by W. K. Greenwood, Kodak Research Laboratories, Rochester, N. Y.

This paper deals in a general way with volume compressors of the type used in

sound recording. The subject matter is divided into six sections: the desirability of volume compression, compressor characteristics, problems arising from the use of compressors, classification of the types of compressors with the advantages and disadvantages of each type, compressor design and the measurement of compressor performance.

"A Single Element Unidirectional Microphone" by Harry F. Olson and John Purton, RCA Laboratories, Princeton, N. J.

A single element unidirectional microphone has been developed for use in sound motion picture recording with the following characteristics:

1. Single ribbon type.
2. The back of the ribbon is coupled to a damped folded pipe and an acoustical impedance in the form of an aperture.
3. Improved cardoid directional pattern.
4. In the high-frequency range

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"RCA Mobile Recording Unit Channel," by Warren Jones, RCA Victor Division, Hollywood, Calif.

The new RCA Unit Channel comprises a complete studio type recording system which has been designed to simplify installation and to provide a system which can be delivered to the customer assembled, wired, and tested, ready for use. The unit channel was designed primarily for mobile use and as such requires storage batteries as its source of power, however, where AC is available the batteries can be bypassed and the motor system operated

directly from the three phase supply.

Complete charging equipment, necessary power controls, and camera motor speed controls are contained in the unit. There are several standard track bodies available on the market which will accommodate the unit channel.

"Variable Area Recording with the Light Valve," by John G. Frayne, Western Electric Company, Hollywood, Calif.

This paper describes how various types of variable area track, including standard and push-pull, may be obtained by various arrangements of the light valve ribbons. A mathematical analysis is made of the effect of various light valve constants on the magnitude of the resonance peak and frequency response measurements of an improved light valve with high magnetic damping are given.

A theoretical study of the effect of azimuth deviation on unilateral, bilateral and bilateral tracks is included in the paper and is illustrated with graphical charts of the distortion produced by various amounts of azimuth deviation for these types of tracks.

"Telecinematic Aspect of Television Monitor Tube Photography," by Fred G. Allen, RCA Victor Division, Hollywood, Calif.

The performances of the iconoscope and electron pick-up tubes and lenscope monitor tubes constituting a television system are considered in regard to the response vs. level characteristics. A non-linear electrical network is advocated for combination with the iconoscope to equalize the Gamma variations to a constant Gamma approximately complementary with the monitor tube Gamma. Another non-linear electrical network is advocated for combination with the iconoscope to reduce the Gamma of this camera to the same Gamma as the selected iconoscope camera.

A direct positive photographic technique is described using a negative monitor picture obtained by electrical phase reversal and the toe region of the positive film characteristic. A general mathematical expression for the shape of the film toe as a function of the Gammas of

of the television camera and monitor is derived for linear overall performance is derived.

The merits of such a photographic technique are economy, simplicity, capability of processing, and greater average screen brightness.

"16 MM Film as a Medium for Television Program Material," by John A. Mauer, J. A. Mauer, Inc., Long Island City, N. Y.

Much of the 16 mm. film that has been available for television broadcast purposes has fallen far short of the technical quality that is possible when the best presently available commercial techniques are used.

This paper discusses the quality possibilities and limitations of 16 mm. cinematography and sound recording to show that it is readily possible to achieve quality in both picture and sound which should be adequate for the needs of television broadcast for a long time in the future.

EQUIPMENT

"Research Council Small Camera Case," by Andrew Cox, Motion Picture Research Council, Inc., Hollywood, Calif.

The Research Council small camera crane was designed from requirements and specifications set down by the Council's Photographic Committee. While similar in principle to other cranes, it embodies an entirely new design and built-in safety features. The crane dolly is externally driven. The boom arm is manually operated and can be panned through 360 degrees. The crane is large enough to have a lens height of from 2 to 10 feet from floor level and small enough so that, fully equipped, it will pass through a doorway 6 feet high and 36 inches wide.

"15 MM Process Protector" by Harold Muller and E. C. Munderfeld, Mitchell Camera Corp., Glendale, Calif.

A studio type of process projector, designed and built to meet the specific needs as set forth by the Motion Picture Research Council Committee, is described. Both the single and the triple head projects are discussed.

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U. S. NAVY DEVELOPS SUPER - SPEED CAMERAS

SCIENTISTS of the United States Navy have developed a novel all electric camera capable of taking photographic exposures at a 100,000,000th of a second—75,000 times faster than the fastest motion picture camera commercially available.

This Zeeem camera, invented by Dr. A. M. Zeeem, heads the list of a series of ingenious precision time measuring instruments and devices used in photographic Microtime Technique, and revealed publicly last month at the Navy's dedication of the new Michelson Laboratory at the Naval Ordnance Test Station, Inyokern, California.

Pointing toward highly increased precision and accuracy, these instruments open a new field of scientific analysis by means of what the Navy terms "synchronized microtime photography." The shutter of the Zeeem camera has been operated so fast that light (which travels at the speed of one thousand million feet per second) moves a distance of only 10 feet during the time of one exposure. It is being used primarily for the study of certain rapidly changing phenomena which heretofore science has been unable to observe and record accurately.

The terrific speed of the Zeeem camera is best illustrated by the fact that—if moving pictures of a bullet leaving the muzzle of a gun were taken at the rate of one hundred million frames per second and projected on a screen at the normal rate—the bullet would appear to require about six hours to travel the distance of 25 feet.

The extremely fast shutter is obtained through the use of an electro optical Kerr cell, a glass tube filled with Numbenzene in which a pair of electrodes is immersed. This Kerr cell is placed between two polaroids crossed so that no light can be transmitted. However, when high voltage is applied to the electrodes in the Kerr cell the state of the polarization of the polarized light is immediately altered allowing the light image of the subject being photographed to pass through the camera lens to the film.

By controlled timing of the voltage, photographic records with an effective exposure rate of one hundredth of a millionth of a second have been obtained. The primary applications of this technique

are to phenomena of ultra short duration. The entire history of an event under observation may take place in one or a few millionths of a second.

Bowen Ultra Speed Camera

Another type of ultra high speed camera disclosed by the Navy is the Bowen 76 lens camera, designed for the Navy by

Dr. I. S. Bowen, Director of the Wilson Observatory. Usually designated as the RC-4, it is a hyper-speed camera designed to take 76 pictures at a maximum rate of 400,000 per second. The high framing rate is obtained by focusing the object on a mirror which—when rotated—will be successively photographed by each of the stationary 76 lens as they are illuminated in turn by the directed light from the rotating mirror.

At maximum operating speed, only 25 microseconds (1/400,000 of a second) are required to take each frame with an exposure time of 11 microseconds. The pictures are approximately one half inch square, and are made on standard 35 mm film. This camera is 37 inches long, 42 inches high, 45 inches wide, and weighs about 575 pounds. Because the exposure time is short and the optical speed of F 16 relatively slow, the RC-4 requires an ex-



Dr. W. M. Cady, Navy scientist, is shown pointing to the row of 76 lenses of the Navy's high-speed Bowen camera. Exposure of 1.1 Microseconds have been obtained. The camera takes 76 pictures at a maximum rate of 400,000 frames per second. Effective size has been made of 15 camera in the study and development of high explosives.

remely bright subject for best photographic results. The camera has been widely and successfully used in the study of high explosives.

The Bowen RC-1 camera is similar to the RC-4, using the principle of the rotating mirror, but containing no shutter. It consists of a field lens, horizontal narrow slit, condensing lens, rotating mirror and film four inches wide by 42 inches long. The field lens focuses the object under study on or along the slit of the camera. The condensing lens behind the

lens by the Navy, which first explains the shutter operation as follows:

"Ordinary light consists of a random mixture of electro magnetic vibrations of no directional preference. When the vibrations exist in only one direction, the light is said to be plane polarized. Polarizers are materials which transmit light, the vibrations of which are in one direction only—all other vibrations are suppressed."

Electrically polarized light is the most general type of polarized light. Plane polarized and circular polarized light are special cases of elliptically polarized light. The state of polarization of light may be altered in several ways, in the Kerr cell, electrically induced optical activity is used to alter at will the state of polarization of light passing through it.

The two polarizers are set for minimum transmission and at 45° to the electrode axis with an voltage applied to the electrodes, the plane polarized light from the first polarizer is completely extinguished by the second polarizer and no light passes through the shutter arrangement. The application of voltage to the Kerr cell electrodes A-A causes alternation in the state of polarization of the transmitted light, consequently the light transmitted by the second polarizer depends upon the voltage applied to the electrodes. The effective open time of the shutter is therefore limited to the capacity with which the voltage can be applied to and removed from the cell electrodes."

Kerr Cell and Camera

A simple combination of a Kerr cell shutter and a conventional still camera may be used to obtain photographs with effective exposure times as short as thousandths of a millionth of a second, the Navy declares. The effective exposure times obtainable with such a camera are determined by the voltage freezing system, and are readily adjustable by means of plug-in type networks. Accuracy of timing pulses is monitored or checked by a special high speed oscillograph—which is capable of indicating time differences of two or three billionths of a second.

IMPROVED SAFETY FILM ANNOUNCED BY KODAK

A new type of film base, adopted by Eastman Kodak Company for manufacture of much of its "safety" motion picture film, was described last month before the national convention of the Society of Motion Picture Engineers in Santa Monica, California.

Charles R. Fordyce, superintendent of Manufacturing Experiments at Kodak Park, the company's research-product plant in Rochester, N. Y., told the Society's meeting that since early in 1946 Kodak has replaced acetate propionate safety film support with a new, improved "high acetyl" acetate type.

He pointed out that Kodak has conducted research on safety film since the early 1920's and developed the first good safety film for its introduction of "home movies" in 1923.

The company's continued research brought a major improvement in safety film quality in 1937 when a change was made to cellulose acetate propionate base. Development of the present improved "high acetyl" formula is the result of extensive research since that time.

Essentially, the new film is made by retaining chemical "acetyl groups" which in the earlier process were washed away.

Fordyce said that considerable experimental work has been done on the new film to test it as a possible substitute for cellulose nitrate film which is widely used for professional motion pictures.

"In addition to experimental tests," he said, "the new film has been carefully watched through limited commercial trade use. Special prints of several feature pictures were circulated through film exchanges in different parts of the country."

"In these tests, for which alternate reels of safety and nitrate film were used in each print, satisfactory quality was obtained in every respect."

Safety film generally is slow-burning, in contrast with nitrate film which burns rapidly.

Commenting on the extensive laboratory test, Fordyce said that results with the new safety film show that:

Low shrinkage of the new safety base will keep the film free from "buckle" and the resulting in-and-out of focus images on the motion-picture screen.

The tensile strength, rigidity, and flexibility of the "high acetyl" film are more like nitrate film than earlier safety films.

Greater resistance to effects of moisture and humidity means less processing trouble as well as less film distortion.

Projection quality, which is better than earlier safety film, is equal to nitrate film in screen readiness and appearance.

New cameras, manufactured especially for use with the new film, will also make satisfactory apices with the older types of safety film and with nitrate film.



Shutter action created by a rotating shutter generating a starburst light effect as played on a graphically drawn object. Note the extra shock wave resulting on left of each photo.

slit directs that slice of the object on the slit as the mirror, from which it is reflected onto the film placed in an arc above the mirror.

The film and the slit are conjugate so that the object focused on the slit is also focused in a narrow line across the film. The usefulness of the RC-3 camera lies in its ability to show one-dimensional motion continuously, as a function of time.

Microtime Photography

Explanation of synchronized microtime photography is briefly described as re-

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'Television & Film Industry'

(Continued from Page 182)

1000 channel allocations in 456 cities. Now let's assume that 5 years from now—or you name the time, but it is inevitable—these 1000 stations are on the air and that they follow the current broadcast pattern. Let's say they carry chain material for the same 5 hours, and that one-half of 25½ hours is 10 hours per day—times 365 days gives 3650 hours of film.

That, gentlemen, comes to 1825 two hour features or 14600 15-minute shorts or its equivalent—plus all of the additional film material, the chains and the 500 remaining independents will use, which is not network originated.

Now, let me sure your imagination is as good as mine, so use your own figures. Discover mine or double them—it's a whale of a lot of film production. And I ask you, are there something for all segments of the motion picture industry to consider seriously? It will require far more film, more technicians, more talent and more equipment than exists today.

I can think of no problem that all of us can look forward to with such high enthusiasm and opportunity!

Colour Subject Available

A two reel film in Technicolor, titled 'Colour,' is now available to amateur movie clubs from British Information Services, 50 Rockefeller Plaza, New York, 20, N. Y.

Although not basing its premise on color motion pictures, it describes the nature of color and its many uses, and studies graphically the great chemical industry and development of modern synthetic dyes.

Kodak Declares Dividend

Quarterly dividend of 35 cents per share on common stock of Eastman Kodak Company was declared May 18th by board of directors, who also voted regular \$1.50 per share dividend on preferred stock. All officers were re-elected at the same meeting.

Floor Stand for Large Screens

Daylight Screen Company of Chicago announces a new floor stand for larger size projection screens up to nine by 12 feet. Model is completely collapsible, and weighs only 18 pounds.

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DU PONT NATIONAL RADIO BROADCAST SALUTES CINEMATOGRAPHY BY NICHOLAS MUSURACA, A.S.C.

Signal recognition of the outstanding photography by Nicholas Musuraca, A.S.C. on the George Stevens production for RKO Radio Pictures, 'I Remember Mama,' was accorded the Director of Photography by E. I. du Pont de Nemours & Company on letters *Cavalcade of America* program broadcast nationally over 155 stations of NBC on evening of May 17th.

Irene Dunne, star of 'I Remember Mama,' was star of the *Cavalcade of America* dramatic presentation, 'Queen of Hearts.'

break Test' on the time to cost radio presentation.

In the closing remarks, the announcer finished the broadcast by stating: 'Irene Dunne can now be seen in the George Stevens production for RKO Radio Pictures, 'I Remember Mama.' Miss Dunne's celebrated charm has been beautifully photographed in this production on DuPont Superior 2 negative by Cinematographer Nicholas Musuraca.

The broadcast was heard nationally by 13,000,000 persons, according to the Hooper rating.

McNabb Re-Elected

B & H President

J. H. McNabb was re-elected president and treasurer of Bell & Howell Company at annual meeting of company last month. Vice presidents for the ensuing year include: A. S. Howell, J. H. Booth, B. E. Seckman, H. W. Haus, H. W. Remerscheid, E. S. Ludlow, and C. E. Phillips.

Company report disclosed record net sales of \$18,083,325 for 1947. Production was at an all time high, but consumer demand continued to exceed the capacity output.

New Kodak 8 MM Projector Has 400 Foot Magazine

An improved model of the famous Kodascope Eight-90 projector—the Eight-90A—is announced by Eastman Kodak Company. Featuring 400 foot reel capacity, the new projector will permit showings up to 30 minutes in length without necessity of changing reels.

Taller base and extended reel arms are main difference over the popular Eight-90. The new projector has laminated Kodak Projection Extension Lens 1 inch f/1.6, 750 watt lamp, and carrying case.



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AMONG THE MOVIE CLUBS

Philadelphia Cinema

Program chairman Frank Hiest lined up the following attractions for the May 11th meeting of Philadelphia Cinema Club, "Our Baby," by B. H. Taylor; "Learn the Alphabet," by Victor Fritz; "Kodachrome Slides" by Mrs. J. H. Correns, demonstration of electric slides by Marvin Epstein, and talk on use of lens tissues by Robert Hartwig.

Members of the club participated in "Zoo Photo Day" on May 16th. Sponsored by the Zoological Society of Philadelphia and Guild of Photographic Dealers, the event allowed special privileges to photographers and a large number turned out to take advantage of the cameras available.

Special attraction for the meeting of June 8th will be film produced by J. B. White on the development of the motion picture from horse and buggy days to the present.

Minneapolis Octo Cine

Sarnold Lyne and his committee provided an informative program on "Exposure" at the May 25th meeting of Minneapolis Octo Cine Club, held at the YMCA, after which several member films were exhibited. Earnest for the 50 foot uncut film contest closed at the meeting, and judges will announce the winners at the forthcoming anniversary party.

Brooklyn Amateur

Films exhibited at the May 5th meeting of Brooklyn Amateur Cine Club, held at Neighborhood House, comprised "Thundering Waters," and "Looming News,"—both by Fred Beach of New York Central Railroad, and "In the Nick of Time," produced by Syracuse Movie Makers. Several member films were run off for comments and suggestions by the club's critical committee.

At meeting of May 19th, election of officers was held for the ensuing year, with nominating committee of Meigs Sinclair, Gemell Chumetz, Erles and Sedekof presenting recommendations. In addition, another popular Cadger Night was staged.

Tri-City Cinema

One hundred members and friends attended the May 20th meeting of Tri City Cinema Club of Davenport, Iowa. Rock Island, and Moline, Ill. held at Unliden Auditorium. Davenport Evening's program included color film and slides "Photographic Safari in Hollywood," by Dr. Paul White with musical accompaniment by Mrs. White, color film and slides "Spring Flowers," by George Frost, and group of colored slides by Arthur Burroughs of the Tulip Festival at Peets, Iowa. Dr. James Dunn presented report of the nominating committee, with Albert Smick slated to be elected president for the coming year.

San Francisco Westwood

Members of the Sherman & Clay Movie Club provided film program for April 26th meeting of Westwood Movie Club of San Francisco, held at St. Francis Community Hall. Subjects screened included "Wandering Through Western Play grounds," by A. Theo Roth, "Lake Tahoe," by George Sobse, and "Canadian Rockies," by Karl Guschel.

Westwood's new monthly club bulletin, "The Revue," which was launched in March, is one of the outstanding and informative bulletins issued by an amateur movie club. Other organizations desiring to exchange monthly bulletins with Westwood can address Denver Sutton 725 Ellis Street, San Francisco, Calif.

Los Angeles Cinema

Members of Los Angeles Cinema Club met at Ithell Club on May 3rd to vote for amendments to club's by-laws setting procedure for application for membership, and also to provide for payment of entrance fee by applicants. William J. Keen and Royal R. Moss joined the board of governors to fill vacancies of Bert Roberts and P. L. Goddard.

Program for the meeting included group of 35 mm. color slides by Julia K. Owen to illustrate her talk on line composition, a discussion of color balance and composition by Theodor Hammer of U.C.L.A., "Two Weeks Rest," by C. Willson White, and "Tui Man Goes Fishing" by Ted Phillips.

New York Metropolitan

Metropolitan Motion Picture Club of New York City wound up its season's activities until September with meeting of May 20th held at the Hotel Pennsylvania. Film program comprised "New York World's Fair 1940," by Ray Moss, "Vacation Highlights," by Terry Mann, and "Geyser," by George Meunas.

Nominating committee consisting of Sidney Morris, W. Eldridge Lewis, and Raymond Moss presented recommendations for successors to the three directors whose terms expire — Harry Graedel, John R. Heifele and Ezzar Miller.

Alhambra La Casa

Regular monthly meeting of La Casa Movie Club of Alhambra, California, was held at the YMCA on evening of May 17th. Film program under chairmanship of John H. Gray included "An even Vacation," by D. M. Gardner, "Orphans," by B. M. Elliott, "Flowers," by R. B. Vail, and "Holiday Visions," by E. K. Kendall.

La Casa will celebrate its 11th birthday on June 21st.

Utah Cine Arts

Al Marston provided a technical discussion on "Exposits," to furnish the May 17th meeting of Utah Cine Arts Club of Salt Lake City. Film program of the evening consisted of a surprise film and "Chasing Rainbows," by F. W. Anderson, "Delight Falls," by F. W. Anderson, and "The Thirsty Niners," by Al Marston.

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ORGANIZING AN AMATEUR MOVIE CLUB

THE tremendous increase in the number of amateur movie enthusiasts during the past three years has generated widespread interest in the formation of amateur clubs in numerous communities. This fact is apparent from the large number of inquiries received, asking for information on how to organize such a group.

Initial steps can be taken by as small a group as five or six persons, who can meet informally to set plans for basic organization and a campaign for members among other movie makers in the vicinity. A temporary chairman should be selected to serve until the club is formally organized, a constitution and by-laws prepared, and officers elected.

Although the individuals interested in organizing the club must contact as many movie enthusiasts as possible, invaluable aid in securing members can and will be provided by photo shops and dealers in the area. The latter should be advised of the plan, and asked to display placed and distribute mimeographed notices giving time and place of initial organizational meeting. These notices can be handed out by the dealer, and—in some cases—be mailed to the most enthusiastic camera owners known to the dealer through his mailing list. The latter will cooperate fully, as the club operation will generate continuing business in camera, equipment and film, which is usually to his advantage.

At the organizational meeting, a committee should be selected to draft the constitution and by-laws which should provide for election of officers, members of a board of directors, and various committee chairmen that will be required.

Most clubs hold monthly meetings, at which time short business session precedes the showing of films—later secured from other amateur clubs or companies, and pictures members have made themselves. From time to time, experts on various phases of movie making can be invited to give informative talks and demonstrations to properly guide members in producing and planning better pictures.

Regular film programs are an important requisite at all meetings, as members will pick up ideas from pictures exhibited, and thus improve their own product. Previous annual award winning films can be secured from the Amateur Cinema League of New York, and on interchange from other amateur clubs around the country. Several equipment manufacturers—notably General Electric Co. and Rudwell & McAllister—have instructive films available on various phases of picture-making. Also, there are a number of large companies that have issued promotional films as travelogues or documentaries, and these

will be most suitable for programming as they will provide members with the professional 16 mm technique for improving their own pictures.

Club activities should be planned to reach every possible member, either on committees or constant approach for him to make and project a subject for the club programs. Periodic contests, for both general club and novice divisions, should be conducted to further generate members' interest. Suitable prizes manually should be awarded to the winners in each division.

One noted amateur movie maker, who is a veteran in one of the largest clubs, issues the note of caution that—in all social clubs—cliques might spring up to dominate the club activities through continual re-election. To prevent this, he suggests that the constitution embody a clause that an officer may not hold position for more than one or two years, and the job must not be undertaken by anyone who previously held the position, unless some others are available. This will spread the direction of the club's activities among virtually all members who have the time available for specific assignments.

Several of the larger clubs screen member 8 mm and 16 mm films on alternate meeting nights. This has proven successful in that the 8 mm filmers consider it unfair to have their pictures projected on the same programs with 16 mm—for obvious reasons.

Seriousness in programming or meeting procedure should be avoided, and the program chairman should inject novelty into the proceedings, and the main objective should be to keep the meeting going at a lively pace. Many clubs have meeting places where members can gather prior to sessions for moderately-priced drinks and round-robin discussions on filming problems, and this feature—or the serving of refreshments during intermission of the general meeting—has been available in generating good-fellowship among members and making them happy to be regular attendees at sessions.

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New 16 MM Sound Projector

Excel Movie Products announces a low-price 16 mm sound projector under brand name of Apollo Sound is reproduced through the loudspeakers of a home radio through a special type hookup requiring no wire connections.

'Lady From Shanghai'

(Continued from Page 201)

head with moving jaws forming a gaping mouth through which the slide passed, and at the foot of the slide two huge turntables, each 35 feet in diameter and specially geared to turn in opposite directions were built.

As might be expected, these gadgets allowed for some very unusual photographic effects. For one shot, Lawton and his operators, Irving Klein, had to slide on their stomachs down the 125-foot zig-zag chute. The camera was mounted on a specially constructed mat which was built to fit the curved contours of the chute. Then, as Welles took a slide, Lawton and Klein, lying flat on the mat, slid ahead of him filming his speedy progress down the whole length of the slide.

A set representing a maze of mirrors and containing 2,912 square feet of reflecting surface was also constructed. Eighty plate glass mirrors, each 7 by 4 feet, formed the basis of this unusual set, and 24 distortion mirrors of similar dimension were interspersed for camera effect. Several of the straight mirrors were of the transparent "two-way" variety which permitted cameramen to shoot action through them from the non-reflecting side. The climax of the picture, during which the antagonists shoot it out in this mirrored room, is one of those unforgettable cinematic moments that seem to occur all too rarely these days. The multiple images and the crashing of glass are directly symbolic of the hostile, many-sided personalities of the characters themselves.

"The Lady From Shanghai" is a puzzling but thrilling picture to watch. Director-producer-writer-star Welles has given it the loving care which is characteristic of his screen endeavors. Cinematographer Charles Lawton, A.S.C., has achieved some extraordinary effects with his unshuttered camera. But the real importance of the picture is its originality, its departure from stereotyped techniques—a healthy sign for an industry that continues to grow.

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'Color'—What It Is

(Continued from Page 176)

distinguishes a red from a yellow or a green from a blue.

The term "intensity" is expressed as the percentage of purity and defines how red or how yellow a color appears to be.

The term "shade" is used to modify that of hue—thus, scarlet is called a shade of red.

The term "tint" is used to denote the effect produced when a certain hue is modified by white—thus, pink is the effect produced when a red is diluted with white.

Brightness is used to distinguish a brighter color from a darker shade of the same hue. Brightness is a common attribute by means of which we can compare a certain color to that in a series of greys existing between black and white. The brightness of an absolute black is zero, as compared with a pure white which has a brightness of 100%.

The whites, greys and blacks which possess brilliance without hue are called "achromatic" colors to distinguish them from "chromatic" colors, which possess both hue and brilliance.

Color is looked upon in different ways by different classes of people. Thus a chemist will consider it as resulting from the varying combination of atoms in the

molecules. The physicist will look upon color as radiant energy of various wave lengths and intensities. The biologist will consider color as a visual phenomenon or the result of the projection of images through the lenses of the eyes, causing very complicated photo-chemical and physical reactions in the eye, optic nerve and brain. The psychologist interprets color as a sensation of the mind and studies the various reactions produced by colors on this mind.

We are all familiar with the various physiological effects that color has on us all. Thus, red has an emotional appeal and may produce a temporary stimulation followed by a nervous reaction sometimes producing a headache. Blue is a serious color and has a cold intellectual appeal. Green is associated with sacred things and also tends to induce happiness and serenity. Purple is symbolic of wisdom. Yellow has a humorous which possesses amiability. Brown is soft and gentle while black will tend to induce sadness.

From another aspect of the same interpretation of color we shall associate red with fire and thus will indicate danger. Green will suggest to us an element of tranquility or safety, while yellow might be associated with the health and glow of sunshine. To explain these physiological and psychological effects of color upon the emotions of human beings it would be necessary to investigate the individual

components of all these colors, each of which will tend to induce a mood or a personal rate of vibration associated in some way with the vibration of that color.

There are three colors which we cannot produce by combination and which we, therefore, call the "primary" colors. These are red, blue and yellow. Any two of these colors will produce what we call the "secondary" or "binary" colors. For example, we get purple by combining red with blue, green from yellow and blue, and orange from red and yellow. The "tertiary" colors are produced using all the three primary colors. Thus an olive shade is made by adding orange to green, and a brown shade by adding purple to orange.

In point of fact, more distinctive shades of brown than any other color known, can be blended by the expert color matcher. For this reason our stylists and the fashion psychologists responsible for developing the feminine tastes like to emphasize these shades because of their orange and blonde, there are probably thousands of brown shades. Actually, there are over thirty thousand shades of all color which are distinguishable and classifiable by the average human eye. The combination of two or all three of these primary colors, in various proportions, plus black and white will theoretically produce any shade desired.

In actual practice there are no red, yellow, or blue pigments which are true spectrum colors, every pigment color available is really a combination of at least two spectrum colors. Thus every red contains an element of blue or yellow. Every blue contains an element of red or yellow. Every yellow contains an element of red or blue.

If we wish to produce a pleasing effect with color there are certain principles which we have to bear in mind with relation to color schemes. The three fundamental principles of color relationship are those of "harmony," "contrast," and "discord."

Harmony between colors is produced by using neighboring colors in their natural order. Thus, orange, orange-red and red are harmonious provided that the red selected is darker than the orange. In a similar way yellow-green, green and blue-green are harmonious. All harmonies are very pleasing, but pleasing things can be overdone. An excess of harmony like excess of sweet things tends to cloy the appetite and become sickly, therefore harmony has to be relieved by contrast and by discord, but this harmony must still remain the basis of any color scheme. It is not desirable to introduce large quantities of the contrasting color and discord. Discord in color like the discord of music must always be a subsidiary effect.

Color contrast is a phenomenon which is deeply involved in the psychology of color effects. To prove this experimentally, we place a small slip of red paper on a large sheet of white surface. We then gaze upon this combination. Suddenly we re-

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move the red paper which, permitting the eye to continue to look steadily at the place formerly occupied by the small slip of paper. We shall discover that a distinct green-blue after image will form on the white paper. In a similar way a red after image can be induced in the eye by means of a green-blue paper, and a blue after-image by means of a slip of orange-yellow paper.

The important point is to observe that the after-image produced is invariably the contrasting color to the original slip of paper. For this reason, we conclude that the phenomenon of contrast is something which is deeply rooted in the very nature of our color perception. It seems that there is a definite psychological need for contrast; the eye jumps for it and it will attempt to induce it in itself if it is not provided with it. Thus, a color scheme may be apt to produce a restless effect if the contrast color to the dominating color of the scheme is absent.

Color discord is the result of combining colors which neither harmonize or contrast. Thus for example, red and yellow-green, yellow and purple, blue and crimson, all these combinations are of the discordant type. Colors which are neither harmonious nor contrasting tend to inter-act upon one another. For instance, a patch of purple upon a blue ground will make the purple appear reddish because the background induces a yellow-orange contrast effect which superimposes itself upon the purple. When we take the same purple and place it over a red background it appears bluish because the background induces a green-blue contrast effect on to the purple. This explains why the same color will look very different when surrounded in different surroundings.

Equally important are tone contrasts, colors which are too different in tone will tend to kill one another. For example, dark violet upon pale yellow tends to look black—while pale yellow upon dark violet tends to look white. For this reason, when color cards are prepared the various colors are set upon a grey background. Grey is selected because it is not such a violent tone contrast as is obtained with white or with black. A colored background would be entirely unsuitable owing to the color reactions produced by processes previously referred to.

Although the actual effectiveness of any particular contrast or discord that may be introduced into a harmonious color scheme are subjects which a skilled artist is best qualified to decide, yet many of the general principles alluded to in this short survey will prevent the practical man from making any glaring mistakes or errors in color selection. If we are particularly interested in this subject we shall conduct for ourselves a visual demonstration of some of the facts about colors and the fundamental principles involved in their arrangement and selection.

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MEMBERS of the American Society of Cinematographers were engaged as Directors of Photography in the Hollywood studios during May as follows:

Allied Artists

- Philip Tanner, *The Bobe Barr Story*, with William Bendix, Claire Trevor, Charles Bickford, Sam Levene, Fred Lightner, William Frawley

Columbia

- Frank Rodman, *Ladies of the Chorus*, with Adele Jergens, Rand Brooks, Marilyn Monroe, Eddie Galt, Stephen Gerrit Bill Edwards, Nan O'Bryen, Marjorie Hoshell, Dove and Allen Barry
- Henry Freshfich, *Black Eagle*, with William Bakus, Virginia Patton, James Bell, Tiesie Berdette, Gordon Jones, Richard Talridge
- Rex Wemy, *Singin' Spots*, with Hooper Hot Shos, Patricia White, Kirby Gray
- Vincent Ponsat, *Gentlemen From Nowhere*, with Warner Banner, Fay Baker, Wilson Graff, Lora Van Nostrum, Noel Madison, Charles Lane
- Burnett Guffey, *Undercover Man*, with Glenn Ford, Nina Foch
- Charles Lawton, Jr., *Walking Hills* with Randolph Scott, Ella Raines, William Bishop, Jeanne Courtland, Edgar Buchanan, John Ireland
- Henry Freshfich, *Rusty Paws a Debt* with Ted Donahue, John Lund, Ann Doran, Gloria Henry, Stephen Dunne

Eagle-Lion

- John Alton, *"29 Chas"* with Richard Basehart, Scott Brady, Roy Roberts

Independent

- George Barnes, *No Minor Victim* (Enterprise) with Dana Andrews, Lili Palmer, Louis Jordan, Norman Lloyd, Jane Wyatt
- Winous Hoch, *The Three Godfathers* (Agency) (Technicolor) with John Wayne, Pedro Armendariz, Harry Carey, Jr., Ward Bond, Ben Johnson, Mac Merh, Jane Darwell
- Mack Stengler, *West of Tomorrow*, with Kristine Miller, Arthur Franz, Mickey Knox, Pat Collins, Bill Murphy, Rick and Jarchel, Tom Noonan, Gene Ray Noble, Ross Ford, Harry Laurer
- Gregg Toland, *Take Three Steps*, (Goldwyn-RKO) with Teresa Wright, David Niven, Evelyn Keyes, Farley Granger, Leo G. Carroll, Joyce Meadows, Philip Friend
- Benjamin Kline, *Trouble Preferred* with Peggy Knudsen, Charles Russell, Lynne Roberts, Mary Bear

Metro-Goldwyn-Mayer

- Robert Plack, *The Three Musketeers*, (Technicolor) with Lina Turner, Gene Kelly, Van Heflin, Jane Alynson, Keenan Wynn, Angela Lansbury, Vincent Price, Gig Young, Robert Coote, John Sutton
- Hal Rosson, *Command Decision*, with Clark Gable, Walter Pidgeon, Van Johnson, Beau Donlevy, Charles Bickford, John Hodiak, Edward Arnold, Clinton Sundberg, Marshall Thompson, Cameron Mitchell
- Charles Rosher, *Words and Music*, (Technicolor) with Judy Garland, Mckay Ruessy, Jane Alynson, Vera-Ellen, Cady Chase, Marshall Thompson, Tom Drake, Perry Como, Ann Southern, Janet Leigh, Gene Kelly, Ann Miller, Lena Horne, Mel Tormé, Der Tormé
- Ray June, *Sun in the Morning*, (Technicolor) with Jeanette MacDonald, Hopi Notch, Claude Jarman, Jr., Liane

Monogram

- William Schrier, *The Mystery of the Golden Eye*, with Roland Winters, Victor Sen Young, Marjorie Moreland, Tim Ryan
- Harry Neumann, *Saddle Sennels*, with Jimmy Wakely, *Carnegie Hall*, Try Lee
- Jackson Rose, *Manhattan Follies*, with Fendita Stewart, Phil Bono, Jane Frenser, Noel Neil, Alan Hale, Jr., Chick Chandler, Gertrude Astor
- William Schrier, *Kidnapped* with Roddy McDowall, Dan O'Herlihy, Sue England, Jimmy Dodd
- Harry Neumann, *Back Trail*, with Johnny Mack Brown, Raymond Harmon, Ted Adams, Pierre Lydon, Marshall Reed, South Pollard

Paramount

- Charles Lang, Jr., *The Tarlock Millions*, with Wanda Hendrix, John Lund, Betsy Fitzgerald, Henry Woolley, Ika Chase, Robert Stock, Dorothy Sackley, Elizabeth Patterson, Dan Toben
- John Seitz, *The Great Gatsby*, with Alan Ladd, Betty Field, MacDonald Carey, Kath Hensley, Barry Sullivan, Howard Da Silva, Shelley Winters, Henry Hull
- Daniel Fapp, *Sons of the Jones*, with Bob Hope, Lucille Ball, Mary Jayne Saunders, Bruce Cabot
- Milton Krauser, *The Accused*, (Hal Wallis Prod.) with Loretta Young, Robert Cummings, Wendell Corey, Douglas Dick, Suzanne Dalton, Sarah Allgood, Henry Travers, Mackay Knox
- Lionel Linde, *Dark Circle*, with Ray Milland, Audrey Totter, Thomas Mitchell

RKO

- Harry Wild, *Weep No More*, with Joseph Cotten, Val, Spring Byington, Jack Paar, Jeff Donnell

- Robert De Gasse, *Bodyguard*, with Lawrence Turney, Francis Lane, Steve Brodie, Jane Clayworth, Elizabeth Kington, Steve Flagg
- J. Roy Hunt, *Indian Agent*, with Tim Holt, Richard Marm, Nan Leslie, Harry Woods, Richard Powin

Twentieth Century-Fox

- Norbert Brodine, *"Road House"*, with Ida Lupino, Cornel Wilde, Calista Hahn, Richard Widmark
- Harry Jackson, *"Boulesque"*, (Technicolor) with Betty Grable, Dan Dailey, Jack Oakie, June Haver, Richard Arlen, James Gleason, Renée Wade
- Charles Clarke, *That Wonderful Urge*, with Tyrone Power, Gene Tierney, Reginald Gardner, Lucille Watson

Universal-International

- Russell Mett, *"Kiss the Blood Off My Hands"*, (Hecht-Norman Prod.) with Joan Fontaine, Ben Lincumar, Robert Newton, Ripley Rock, Colin Keith-Johnson, Peter Hobbes, Gnaeida Hervey, Marilyn Williams, Harold Goodwin, Valene Cardew, Alex Harford, Reginald Sheffield, Tom Dillon, Keith Hurblock
- Maury Gerstman, *Rogue's Regiment*, with Dick Powell, Maria Toren, Vincent Price, Stephen McNally, Carol Thurston, Kermy Washington, Philip Abn, Richard Lee, Edgar Barnes, Richard Frazer, Fred Torner, Henry Rowland
- Irving Glassberg, *Lancers*, with John Payne, Joan Caulfield, Dan Duray, Shelley Winters, Richard Robert, Dorothy Hart, Nicholas Joy, Percy Helton
- Russell Mett, *"You Gotta Sway Happy"*, (Rampant Prod.) with Joan Fontaine, James Stewart, Eddie Albert, Roland Young, Porter Hall, Halliwell Hobbes, Willard Parker, William Bakewell, Joe Cook, Jr., Paul Cavanaugh, Mary Forbes
- Arthur Edson, *"The O'Flynn"*, with Douglas Fairbanks, Jr., Helene Carter, Richard Greene, Patricia Medina, Arthur Shields, J. M. Kerrigan, Lumsden Hare

Warner

- Robert Bork, *"A Kiss in the Dark"*, with Jane Wyman, David Niven, Wayne Morris, Victor Moun, Broderick Crawford
- Ernst Haller, *"My Dream Is Yours"*, (Curtis Prod.) (Technicolor) with Jack Carson, Doris Day, Lee Bowman, Eve Arlen, Adolphe Menjou, S. Z. Sakall, Edgar Kennedy
- Peverell Marley, *"Silver Lining"*, (Technicolor) with Jose Haver, Kay Bolger, Gordon MacRae, Charlie Ruggles, Rosemary De Camp, Lee Wilde, Lyn Wilde
- Carl Guthrie, *"Smart Money"*, with Zachary Scott, Virginia Mayo, Dorothy Malone, Tom D'Andrea, Douglas Kennedy, Helen Westcott
- Carl Guthrie, *"Girl From Jones Beach"*, with Ronald Reagan, Virginia Mayo, Dane Clark, Los Wilson

'Babe Ruth Story'

(Continued from Page 151)

of lighting produces numerous shadows, for virtual total loss of authenticity for the scene.

To provide the necessary outdoor realism in lighting, I obtained the largest and strongest arc lamps available today—the Mole Richardson Bruns—and lighted the entire set with these. One major problem which confronted me was necessity of obtaining a single shadow at all times, no matter where the players were. So the lights had to be placed in such a manner that each blended into the other. As each lamp had to overlap with the light from another as it hit the ground, two shadows were produced, so large black canvas mats were made for placement in front of the arcs to eliminate the overlap of light and at the same time preventing a mix shadow between the two arcs.

With the source light placed in this manner, the fill-in or reflected light had to be added. This was obtained by arc broadsides mixed in with incandescents far away from the people in the scene to prevent any secondary shadows. With the set fully lighted in this way, it made shooting both easy and fast. It might be pointed out that, at no time did I shift the source of lighting from long shots to close-ups—keeping in mind that were the same shot being shot outside, I could not move the sun around to suit my convenience.

The same documentary effect was maintained when other sets came up. For example—in a train sequence we departed from accepted procedure of breakaway sides and ceiling, and had a full train with permanent sides and fittings. And that's the way it was shot.

Keeping in mind that—were I to shoot this same train on the outside—I would have to depend entirely on the natural light source coming through the windows from the sun, and whatever reflected from that original base. So, the source light again was provided by arcs, coming from one direction only. The arcs were hung on pulleys to provide the effect of the train moving, while the reflected light was supplied by properly-placed incandescents with the assistance of photofloods. Also, in some of the shots, rear projection was employed.

Of particular interest photographically

on "The Babe Ruth Story" was the necessity of obtaining closeups of the pitcher throwing the ball, and the batter whaling it out. The script and director called for realism, and it was up to us to provide the maximum for such requirements. It was decided that the best and most striking effects could be secured if the camera was set up in place of the catcher behind the home plate to record the acquired closeups.

But without adequate protection for the camera crew and expensive camera and lens, the hard pitched ball or foul tip could cause serious injury or camera damage to delay production. But the camera was placed directly behind home plate and we erected a large sheet of non-breakable glass one-inch thick between the batter and camera. As a result, both camera and crew had adequate protection against incoming balls, and thrilling and unusual shots were secured.

For longer shots from behind the plate, where the script called for inclusion of the catcher and umpire in the action with the batter, the camera was set up directly in front of the grandstand—but with a frame of steel wire to protect the camera and crew from any stray foul tip. This setup is shown in accompanying diagram.

As the studio stage naturally was not large enough for the full sized baseball diamond, the replica of the Yankee park infield was somewhat reduced. For example, the distance between bases was cut from the regulation 90 feet to 75, while distance between the pitcher's mound and home plate was reduced to 50 feet. But the utilization of short focal length lenses, such as the 25 mm and 30 mm, provided the proper perspective to give audiences the right perspective in regards to the regulation size of the playing field.

Pioneers of 16 MM Honored

Willard Cook, who introduced the exclusive use of acetate non-inflam film for non-theatrical purposes in the United States via sub-standard 28 mm size and Alexander F. Vactor, who designed and manufactured one of the first 16 mm cameras and projectors, were honored with presentation of bronze plaques at recent convention of Allied Non-Theatrical Film Association. Honors were bestowed for pioneering efforts in the non-theatrical field of safety films.

Carter Heads ANFTA

E. E. Carter of Raleigh, N. C. was elected president of Allied Non-Theatrical Film Association for the ensuing year. Other officers elected were: Edward H. Stevens, first vice-president; Maurice T. Green, second vice-president; George H. Cole, treasurer; Jerome J. Cohen, secretary; and Harold Baumann—J. Ken Lilley, William L. Rogers, and Alvin Twyman, directors.

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